



## Complete Summary

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### GUIDELINE TITLE

Clinical guideline on appropriate use of local anesthesia for pediatric dental patients.

### BIBLIOGRAPHIC SOURCE(S)

American Academy of Pediatric Dentistry (AAPD). Clinical guideline on appropriate use of local anesthesia for pediatric dental patients. Chicago (IL): American Academy of Pediatric Dentistry (AAPD); 2005. 8 p. [41 references]

### GUIDELINE STATUS

This is the current release of the guideline.

### \*\* REGULATORY ALERT \*\*

### FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

On Monday, February 13, 2006, the U.S. Food and Drug Administration (FDA) issued a Public Health Advisory to notify healthcare professionals and patients about adverse events, including methemoglobinemia, associated with the use of benzocaine sprays used in the mouth and throat. Benzocaine sprays are used in medical practice for locally numbing mucous membranes of the mouth and throat for minor surgical procedures or when a tube must be inserted into the stomach or airways. On February 8, 2006, the Veterans Health Administration (VA) announced the decision to stop using benzocaine sprays for these purposes. The FDA is aware of the reported adverse events and is reviewing all available safety data, but at this time is not planning action to remove the drugs from the market. The FDA is highlighting safety information previously addressed by the Agency, has provided other information for the consideration of clinicians in the PHA and will make further announcements or take action as warranted by the ongoing review. See the [FDA Web site](#) for more information.

### COMPLETE SUMMARY CONTENT

\*\* REGULATORY ALERT \*\*

SCOPE

METHODOLOGY - including Rating Scheme and Cost Analysis

RECOMMENDATIONS

EVIDENCE SUPPORTING THE RECOMMENDATIONS

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
CONTRAINDICATIONS  
IMPLEMENTATION OF THE GUIDELINE  
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY  
DISCLAIMER

## SCOPE

### DISEASE/CONDITION(S)

Pain during delivery of oral health care

### GUIDELINE CATEGORY

Management  
Treatment

### CLINICAL SPECIALTY

Dentistry  
Pediatrics

### INTENDED USERS

Dentists

### GUIDELINE OBJECTIVE(S)

To help practitioners make appropriate decisions when using local anesthesia to control pain in infants, children, adolescents, and persons with special health care needs during the delivery of oral health care

### TARGET POPULATION

Infants, children, adolescents, and persons with special health care needs undergoing dental procedures

### INTERVENTIONS AND PRACTICES CONSIDERED

1. Topical anesthetics, such as lidocaine and benzocaine
2. Injectable local anesthetics and vasoconstrictors
  - Lidocaine
  - Mepivacaine
  - Articaine
  - Prilocaine
  - Bupivacaine
  - Epinephrine
  - Norepinephrine

- Levonordefrin
- 3. Selection of syringes and needles
- 4. Documentation of local anesthesia administration
- 5. Supplemental injection techniques
  - Computer-controlled local anesthetic delivery
  - Periodontal injection techniques (i.e., periodontal ligament [PDL], intraligamentary, and peridental injection)
  - "Needle-less" systems
  - Intraseptal or intrapulpal injection
- 6. Emergency and complication management
- 7. Administration of local anesthesia with sedation, general anesthesia, and/or nitrous oxide/oxygen analgesia/anxiolysis

#### MAJOR OUTCOMES CONSIDERED

- Patient satisfaction
- Level of pain
- Side effects of local anesthetic administration

### METHODOLOGY

#### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

#### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

A PUB MED search was conducted using the terms "anesthesia" and "local anesthesia."

#### NUMBER OF SOURCE DOCUMENTS

Not stated

#### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

#### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

#### METHODS USED TO ANALYZE THE EVIDENCE

Review

#### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The oral health policies and clinical guidelines of the American Academy of Pediatric Dentistry (AAPD) are developed under the direction of the Board of Trustees, utilizing the resources and expertise of its membership operating through the Council on Clinical Affairs (CCA).

Proposals to develop or modify policies and guidelines may originate from 4 sources:

1. The officers or trustees acting at any meeting of the Board of Trustees
2. A council, committee, or task force in its report to the Board of Trustees
3. Any member of the AAPD acting through the Reference Committee hearing of the General Assembly at the Annual Session
4. Officers, trustees, council and committee chairs, or other participants at the AAPD's Annual Strategic Planning Session

Regardless of the source, proposals are considered carefully, and those deemed sufficiently meritorious by a majority vote of the Board of Trustees are referred to the CCA for development or review/revision.

Once a charge (directive from the Board of Trustees) for development or review/revision of an oral health policy or clinical guideline is sent to the CCA, it is assigned to 1 or more members of the CCA for completion. CCA members are instructed to follow the specified format for a policy or guideline. All oral health policies and clinical guidelines are based on 2 sources of evidence: (1) the scientific literature; and (2) experts in the field. Members may call upon any expert as a consultant to the council to provide expert opinion. The Council on Scientific Affairs provides input as to the scientific validity of a policy or guideline.

The CCA meets on an interim basis (midwinter) to discuss proposed oral health policies and clinical guidelines. Each new or reviewed/revised policy and guideline is reviewed, discussed, and confirmed by the entire council.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Once developed by the Council on Clinical Affairs (CCA), the proposed policy or guideline is submitted for the consideration of the Board of Trustees. While the board may request revision, in which case it is returned to the council for modification, once accepted by majority vote of the board, it is referred for Reference Committee hearing at the upcoming Annual Session. At the Reference Committee hearing, the membership may provide comment or suggestion for alteration of the document before presentation to the General Assembly. The final document then is presented for ratification by a majority vote of the membership present and voting at the General Assembly. If accepted by the General Assembly, either as proposed or as amended by that body, the document then becomes the official American Academy of Pediatric Dentistry (AAPD) oral health policy or clinical guideline for publication in the AAPD's Reference Manual and on the AAPD's Web site.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

#### Topical Anesthetics

1. Topical anesthetic may be used prior to the injection of a local anesthetic to reduce discomfort associated with needle penetration.
2. The pharmacological properties of the topical agent should be understood.
3. A metered spray is suggested if an aerosol preparation is selected.
4. Systemic absorption of a lidocaine topical anesthetic must be considered when calculating the total amount of anesthetic administered.

#### Selection of Syringes and Needles

1. For the administration of local dental anesthesia, dentists should select aspirating syringes that meet the standards of the American Dental Association (ADA).
2. Short needles may be used for any injection in which the thickness of soft tissue is less than 20 mm and a long needle for a deeper injection into soft tissue (Malamed, "The needle," 2004). Any 23- through 30-gauge needle may be used for intraoral injections since blood can be aspirated through all of them; however, aspiration can be more difficult when smaller gauge needles are used (Malamed, "The needle," 2004). An extra-short, 30-gauge is appropriate for infiltration injections (Malamed, "The needle," 2004).
3. Needles should not be bent or inserted to their hub for injections to avoid needle breakage (Malamed, "The needle," 2004).

#### Injectable Local Anesthetic Agents

1. Selection of local anesthetic agents should be based upon:
  - a. The patient's medical history and mental/developmental status
  - b. The anticipated duration of the dental procedure
  - c. The need for hemorrhage control

- d. The planned administration of other agents (e.g., nitrous oxide, sedative agents, general anesthesia)
  - e. The practitioner's knowledge of the anesthetic agent
- 2. Use of vasoconstrictors in local anesthetics is recommended to decrease the risk of toxicity of the anesthetic agent.
- 3. In cases of bisulfate allergy, use of a local anesthetic without vasoconstrictor is indicated. Local anesthetic without vasoconstrictor also can be used for shorter treatment needs.
- 4. The established maximum dosage for any anesthetic should not be exceeded.

See Tables 1 and 2 in the original guideline document for injectable local anesthetics, their maximum dosages, and the dosage per dental cartridge.

#### Documentation of Local Anesthesia

1. Documentation must include the type and dosage of local anesthetic in milligrams. Vasoconstrictor, if any, must be noted either in milligrams or concentration (e.g., 36 mg lidocaine with 0.018 mg epinephrine or 36 mg lidocaine with 1:100,000 epinephrine) (Malamed, "Basic injection technique," 2004).
2. Documentation may include the type of injection(s) given (e.g., infiltration, block, intraosseous), needle selection, and patient's reaction to the injection.
3. Post-operative instructions (e.g., behavioral and dietary precautions) should be given to the patient and/or caregiver.
4. If the local anesthetic was administered in conjunction with sedative drugs, the doses of all agents must be noted on a time-based record.
5. In patients for whom the maximum dosage of local anesthetic may be a concern, the weight should be documented preoperatively.

#### Local Anesthetic Complications

1. Practitioners who utilize any type of local anesthetic in a pediatric dental patient shall possess appropriate training and skills and have available the proper facilities, personnel, and equipment to manage any reasonably foreseeable emergency.
2. Care should be taken to ensure proper needle placement during the intraoral administration of local anesthetics. Practitioners should aspirate before every injection and inject slowly.
3. After the injection, the doctor, hygienist, or assistant should remain with the patient while the anesthetic begins to take effect.
4. Residual soft tissue anesthesia should be minimized in pediatric and special health care needs patients to decrease risk of self-inflicted post-operative injuries.
5. Practitioners should advise patients and their caregivers regarding appropriate behavioral precautions and the possibility of soft tissue trauma following the administration of local anesthesia.

#### Supplemental Injections to Obtain Local Anesthesia

1. Alternative techniques for the delivery of local anesthesia may be considered to minimize the dose of anesthetic used, improve patient comfort, and/or improve successful dental anesthesia.

## Local Anesthesia with Sedation, General Anesthesia, and/or Nitrous Oxide/Oxygen Analgesia/Anxiolysis

1. Particular attention should be paid to local anesthetic doses used in children. To avoid excessive doses for the patient who is going to be sedated, a maximum recommended dose based upon weight should be calculated.
2. The dosage of local anesthetic should not be altered if nitrous oxide/oxygen analgesia/anxiolysis is administered.
3. When general anesthesia is employed, local anesthesia may be used to reduce the maintenance dosage of the anesthetic drugs. The anesthesiologist should be informed of the type and dosage of the local anesthetic used. Recovery room personnel also should be informed.

### CLINICAL ALGORITHM(S)

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

All oral health policies and clinical guidelines are based on 2 sources of evidence: (1) the scientific literature; and (2) experts in the field.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Appropriate use of local anesthesia in pediatric patients and patients with special health care needs, enables the prevention of pain, builds trust, allays fear and anxiety, and promotes a positive dental attitude.

### POTENTIAL HARMS

- Side effects and toxicities of local anesthetics, epinephrine, and levonordefrin (including central nervous system and cardiovascular toxicity during overdose, allergic reactions, paresthesia, and post operative soft tissue injury).
- An end product of prilocaine metabolism can induce formation of methemoglobin, reducing the oxygen carrying capacity of the blood. In patients with subclinical methemoglobinemia or with toxic doses ( $>6\text{mg/kg}$ ), prilocaine can induce methemoglobinemia symptoms (e.g., grey or slate blue cyanosis of lips, mucous membranes, and nails; respiratory and circulatory distress).
- Accidental lip or cheek trauma.

- If a local anesthetic is injected into an area of infection, its onset will be delayed or even prevented and inserting a needle into an active site of infection also could lead to possible spread of the infection.

## CONTRAINDICATIONS

### CONTRAINDICATIONS

- Epinephrine is contraindicated in hyperthyroid patients.
- Levonordefrin and norepinephrine are absolutely contraindicated in patients receiving tricyclic antidepressants since dysrhythmias may occur (epinephrine dose should be kept to a minimum).
- Absolute contraindications for local anesthetics include a documented local anesthetic allergy (allergy to 1 amide does not rule out the use of another amide, but allergy to 1 ester rules out use of another ester).
- A bisulfate preservative is used in local anesthetics containing epinephrine. For patients having an allergy to bisulfates, use of a local anesthetic without vasoconstrictor is indicated.
- Intraosseous techniques may be contraindicated with primary teeth due to potential for damage to developing permanent teeth.
- The use of the periodontal ligament injection or intraosseous methods is contraindicated in the presence of inflammation or infection at the injection site.
- Prilocaine may be contraindicated in patients with methemoglobinemia, sickle cell anemia, anemia, or symptoms of hypoxia or in patients receiving acetaminophen or phenacetin, since both medications elevate methemoglobin levels.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### IMPLEMENTATION TOOLS

Chart Documentation/Checklists/Forms  
Resources

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Staying Healthy

## IOM DOMAIN

Effectiveness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

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### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2005

### GUIDELINE DEVELOPER(S)

American Academy of Pediatric Dentistry - Professional Association

### SOURCE(S) OF FUNDING

American Academy of Pediatric Dentistry

### GUIDELINE COMMITTEE

Council on Clinical Affairs

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Not stated

### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

### GUIDELINE STATUS

This is the current release of the guideline.

### GUIDELINE AVAILABILITY

Electronic copies: Available from the [American Academy of Pediatric Dentistry Web site](#).

Print copies: Available from the American Academy of Pediatric Dentistry, 211 East Chicago Avenue, Suite 700, Chicago, Illinois 60611

#### AVAILABILITY OF COMPANION DOCUMENTS

Information about the American Academy of Pediatric Dentistry (AAPD) mission and guideline development process is available on the [AAPD Web site](#).

The following implementation tools are available for download from the AAPD Web site:

- [Dental growth and development chart](#)
- [American Academy of Pediatric Dentistry Caries-Risk Assessment Tool \(CAT\)](#)

#### PATIENT RESOURCES

None available

#### NGC STATUS

This NGC summary was completed by ECRI on August 19, 2005. This summary was updated by ECRI on February 21, 2006 following the U.S. Food and Drug Administration (FDA) advisory on benzocaine sprays.

#### COPYRIGHT STATEMENT

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